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EXAMINER	
ROSENAU, DEREK JOHN	
ART UNIT	PAPER NUMBER
2834	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/536,479	TREAT, MICHAEL R	
	Examiner	Art Unit	
	Derek J. Rosenau	2834	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 May 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-34* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *1-15 and 29-32* is/are allowed.

6)☒ Claim(s) *16-28,33 and 34* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *10 May 2007* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. The drawings were received on 5/10/2007. These drawings are accepted.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 16-19, 21, 25-27, 33, and 34 are rejected under 35 U.S.C. 102(b) as being anticipated by Onishi et al. (US 5134334).

4. With respect to claim 16, Onishi discloses a device (Fig 1) comprising: a flexible substrate or first surface (item 3); and at least one source of vibrational energy (items 6 and 7) attached to or in communication with the flexible substrate or first surface (Figs 6a-6h), wherein vibrational energy is applied to the flexible substrate or first surface to cause periodic motion in the flexible substrate or first surface (Figs 6a-6h) and the device is capable of translational motion along a second surface (item 8) or through a fluid (column 4, lines 31-61).

5. With respect to claim 17, Onishi et al. discloses the device of claim 16, wherein the vibration energy is harmonic (Figs 6a-6h).

6. With respect to claim 18, Onishi et al. discloses the device of claim 17, wherein the vibrational energy causes the substrate or surface to flex in a harmonic fashion (Figs 6a-6h).

7. With respect to claim 19, Onishi et al. discloses the device of claim 17, wherein at least one of the at least one source of vibrational energy imparts vibrations to said substrate or first surface (Figs 6a-6h) to cause said device to move in a translational fashion (column 4, lines 31-61).

8. With respect to claim 21, Onishi et al. discloses the device of claim 16 wherein a change in frequency of the vibrational energy causes the direction of the motion of the device to change (column 4, lines 50-55).

9. With respect to claim 25, Onishi et al. discloses a method for imparting translational motion to an object on a first surface or in a fluid, the object comprising a flexible substrate (item 3) having at least one substantially flat surface (Fig 1) and a source of vibrational energy (items 6 and 7) attached to or in communication with at least one of the at least one substantially flat surface to apply vibrational energy to the flexible substrate (Figs 6a-6h), said method comprising the steps of: (a) vibrating the object to produce harmonic motion (Figs 6a-6h); and (b) coupling the vibration to the first surface or fluid in an asymmetrical way to produce translational motion by the object (column 4, lines 31-61 and column 5, line 60 through column 6, line 2)

10. With respect to claim 26, Onishi et al. a method for imparting translational motion to an object having a flexible substrate (item 3) on a first surface and a source of vibrational energy (items 6 and 7) on a second surface (item 8) or in a fluid, said method comprising the steps of: (a) applying vibrational energy to the object to produce harmonic vibrations in the flexible substrate or first surface (Figs 6a-6h); and (b) coupling the vibrations to the second surface in an asymmetric way to produce

translation motion by the object (column 4, lines 31-61 and column 5, line 60 through column 6, line 2).

11. With respect to claim 27, Onishi et al. discloses the method of claim 26, wherein a force in one direction during one part of the wave cycle is not counterbalanced by an equal and opposition force in the other direction (column 4, lines 31-61). Additionally, because the device of Onishi et al. moves translationally, the forces must be unbalanced.

12. With respect to claim 33, Onishi et al. discloses the device of claim 16, wherein the flexible substrate is circular, rectangular, oval, square, or hemispherical (Fig 1).

13. With respect to claim 34, Onishi et al. discloses the method of claim 25, wherein the flexible substrate has a first and second substantially parallel planar surface (Fig 1).

Claim Rejections - 35 USC § 103

14. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

15. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Onishi et al.

16. With respect to claim 20, Onishi et al. discloses the device of claim 16; but does not disclose expressly that the second surface is other than horizontal. However, it would have been obvious to a person of ordinary skill in the art to place the second

surface of Onishi et al. at an incline for the benefit of providing an additional dimension of movement.

17. Claims 22-24 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Onishi et al. in view of Culp (US 5350966).

18. With respect to claim 22, Onishi et al. discloses the device of claims 1, 10, and 16.

Onishi et al. does not disclose expressly an asymmetry element.

Culp teaches a piezoelectric device with asymmetric elements (Fig 10, item 62).

At the time of invention, it would have been obvious to a person of ordinary skill in the art to combine the asymmetric elements of Culp with the device of Onishi et al. for the benefit of augmenting the propulsive effects (column 6, lines 11-20 of Culp).

19. With respect to claim 23, the combination of Onishi et al. and Culp discloses the device of claim 22. Culp disclose that the asymmetry element comprises bristles, spines or spicules embedded in a flexible matrix, regular or irregular projections, fins, or a conformable mat (Figure 10, item 62).

20. With respect to claim 24, the combination of Onishi et al. and Culp discloses the device of claim 23. Culp discloses that the asymmetry element comprises bristles (Fig 10, item 62).

21. With respect to claim 28, Onishi discloses the method of claims 25 and 26. Onishi et al. produces a net force in one direction when averaged over the entire vibratory cycle (column 4, lines 31-61). Additionally, because the device of Onishi moves translationally, there must be an average net force.

Onishi et al. does not disclose expressly an asymmetry element.

Culp teaches a piezoelectric device with asymmetric elements (Fig 10, item 62).

At the time of invention, it would have been obvious to a person of ordinary skill in the art to combine the asymmetric elements of Culp with the device of Onishi et al. for the benefit of augmenting the propulsive effects (column 6, lines 11-20 of Culp).

Allowable Subject Matter

22. Claims 1-15 and 29-32 are allowed.

23. The following is an examiner's statement of reasons for allowance: the prior art does not disclose or suggest "wherein the vibrational energy causes periodic motion in the flexible substrate to cause the device to adhere to an exterior surface" in combination with the remaining claim elements. Onishi et al. discloses a device that is adhered to an exterior surface; however, it is adhered to the surface by gravity, not vibrational energy.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Response to Arguments

24. Applicant's arguments filed 5/10/2007 have been fully considered but they are not persuasive. Applicant argues that the device of Onishi et al. does not adhere to a surface. However, the device does adhere to a surface, in that gravity causes it to adhere to the surface.

Conclusion

25. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Pelrine et al. (US 20040232807) discloses a piezoelectric inchworm actuator that is adhered to a vertical surface, but by electrostatic clamps, not vibrational energy. Tomikawa (US 6072266) discloses a piezoelectric device having a flexible substrate in which vibrational energy in communication with the flexible substrate causes translational motion, and in which the device is adhered to the surface on which it moves; however, it is adhered by gravity, not vibrational energy.

26. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Derek J. Rosenau whose telephone number is 571-272-8932. The examiner can normally be reached on Monday thru Thursday 7:00-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Darren Schuberg can be reached on 571-272-2044. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Derek J Rosenau
Examiner
Art Unit 2834

DJR
6//21/2007

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